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APPLICATION

OF

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ON

STATISTICAL ANALYSIS SYSTEM FOR USE WITH PUBLIC COMMUNICATION FACILITY

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STATISTICAL ANALYSIS SYSTEM FOR USE WITH PUBLIC COMMUNICATION FACILITY

Background and Summary of the Invention

This is a continuation-in-part of Application Serial No. 753,299 filed July 10, 1985 and entitled "Statistical Analysis System for Use With Public Communication Facility", now abandoned.

Various forms of public polling have come into widespread use. Telecommunications afford a valuable tool for such activity. To some extent, telecommunication polling has been automated, particularly with regard to specific test groups. However, sometimes it is desirable to perform analysis to identify specific selections with respect to very large groups of people who are not preselected for use in an organized calling campaign. For example, it may be desirable to obtain medical data from a large group of people, to correlate such data, then to identify a select subset of the group using some external data. Also, it may be desirable to collect such medical data selectively from people who have purchased a test kit or the like for obtaining data. In any event, a need exists for an effective, economical, and expedient system for performing such analysis and selection.

It has been proposed to use telecommunications systems to interface control systems with individuals who provide digital identification data by actuating a digital mechanism. For example, it has been proposed to interface individuals at telephone calling stations with recorded voice messages prompting the provision of address data by actuating the numeric or alphabetic buttons that are conventionally employed for dialing another telephone station. In general, such techniques have been used to provide specific select information. For example, a caller might actuate dialing buttons to selectively address specific information in a computer of interest to him. In another arrangement, dialing buttons may be actuated to specify a billing designation as for requested services. In the course of such operations, difficulties sometimes arise which are frustrating or confusing to a caller and may ruin the communication. Nevertheless, such techniques offer enhanced possibilities and in general the system of the present invention is based on the recognition of certain of those possibilities.

Telecommunications also have come into widespread use with respect to merchandising. Specifically, for example, most mail-order organizations have telecommunications facilities, some of which may be automated to a limited extent. Television merchandising operations also often involve the supplemental use of the telephone. Accordingly, a need exists to improve telecommunication facilities for such operations with respect to economy, convenience and reliability.

In general, the present invention comprises a system of analysis, selection and data processing for operation in cooperation with a public communication

facility, e.g. a telephone system. A voice origination or organization apparatus prompts individual callers to provide select digital data to develop a record for further processing. If appropriate, abort capability allows a caller to interface directly with an operator. A control system may qualify a caller then provide data cells for storing individual data and assigning definitive identifications to such data (and to the caller) and for testing such data, as for the selection of a subset of callers. A variety of memory techniques are used to selectively activate the voice origination apparatus. Accordingly, statistical analysis and selection can be effectively accomplished economically with respect to a substantially unlimited set of callers who are accommodated by a public communication system. In a related aspect, callers can provide data as for merchandising, or various other telecommunications operations involving a large number of persons and a large volume of data.

Brief Description of the Drawings

In the drawings, which constitute a part of this specification, exemplary embodiments exhibiting various objectives and features hereof are set forth, specifically:

FIGURE 1 is a block diagram of a system constructed in accordance with the present invention;

FIGURE 2 is a fragmentary diagrammatic representation of a storage cell as may be formatted in the system of FIGURE 1;

FIGURE 3 is a flow diagram of one operating format of the system of FIGURE 1;

FIGURE 4 is a block diagram of a form of key test unit as may be employed in the system of FIGURE 1;

FIGURE 5 is a fragmentary diagrammatic

representation of another storage cell as may be formatted in the system of FIGURE 1; and

FIGURE 6 is a block diagram of a form of analysis means as may be employed in the system of FIGURE 1.

Description of the Illustrative Embodiment

As required, a detailed illustrative embodiment of the present invention is disclosed herein. However, physical communication systems, data formats, and operating structures in accordance with the present invention may be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiment. Consequently, the specific structural and functional details disclosed herein are merely representative; yet in that regard, they are deemed to afford the best embodiment for purposes of disclosure and to provide a basis for the claims herein which define the scope of the present invention.

Referring initially to FIGURE 1, a series of remote terminals T1 through TN are represented (left). The terminals are generally similar, and accordingly, only the terminal T1 is illustrated in detail. In the disclosed embodiment, the remote terminals T1 through TN comprise various telephone terminals coupled to a communication facility C which may take the form of a comprehensive telephone system for interconnecting any associated terminals. The communication facility C is also coupled to a data development central station D in accordance herewith, an embodiment of which is illustrated in some detail.

Generally in accordance with the present development, individual callers use the individual telephone stations T1 through TN to interface the data

development station D through the communication facility C. Also in accordance herewith, the data of individual callers is collected and correlated in the data station D for processing in accordance with external data. As a consequence, various objectives are accomplished. For example, a select subset of the callers may be isolated and specifically identified, or related data may be processed, or transactions may be actuated. The possibilities are substantial and varied as will be apparent from the exemplary functions as described in detail below.

As indicated, several polling, actuating, marketing or informing operations can be accomplished utilizing systems in accordance herewith. For example, the public might be polled with regard to locating the specific purchasers of a defective and dangerous product. The public might be polled with the objective of locating persons susceptible to a specific ailment or disease. In a less serious vein, but one of particular commercial significance, the system also might be employed in various public communication game formats or, where legal and deemed in the public welfare, public lotteries. The system also might be used to automate a mail-order operation, even to the extent of inventory control as detailed below.

Considering the system of FIGURE 1 in mewhat greater detail, it is to be understood that communication facility C has multiplexing bility for individually coupling the terminals T1- the central station C on request. In the :rative form of the system, the communication ity C comprises a public telephone facility and ndividual terminals T1-TN take various forms of ing telephone instruments. In that regard, the hone terminal T1 is represented in some detail to

include a hand piece 10 (microphone and earphone) and a panel 12 provided with a rectangular array of push buttons 14 in the conventional configuration.

In accordance with conventional telephone designations, alphabetic and numeric designations are provided on the buttons 14. For example, several of the buttons 14 carry three letters along with a decimal numeral. Specifically, the button designated with the numeral "2" also carries the letters "A", "B" and "C". In that manner, the buttons 14 encompass the numerals "0-9", two symbols, and the alphabet except for the letters "Q" and "Z". Consequently, the buttons 14 accommodate entry of decimal data along with a wide range of alphabetic data. In that regard, the buttons 14 designated with symbols "*" and "#" as well as the numeral "0" can be used by predetermined assignment to represent the letters "Q" and "Z" or any of a variety of other data or commands. Generally, in accordance herewith, the buttons 14 are employed to formulate digital data at the central station D in various formats determined by the current specific use and operating format of the system.

Considering the central station D in somewhat greater detail, the communication facility C is coupled to an interface unit 20 which incorporates modems, tone decoders, and switching mechanisms. The interface unit 20 affords couplings to a computer 22 which may take the form of a mini-unit programmed for example in accordance with the functions as set forth below. Generally, the computer 22 performs several distinct and separate operations. Specifically, the computer 22 may initially qualify a caller. In that regard, if a select group of callers are to have access to the system, a portion of the computer 22 designated as a key test unit 23 qualifies individual callers who

present a key number. An exemplary detailed embodiment of the key test unit 23 is described below.

With clearance of a caller by the key test unit 23, the system enters a further data acquisition phase with respect to that caller. Specifically, the computer 22 receives detailed data from a caller at any one of the individual stations T1-TN (through the communication facility C) which data is organized, tagged to be identified, and stored. Tests and confirmations may be performed during this phase of operation. Thereafter, during a processing phase, the computer 22 processes the stored data. For example, the processing may involve applying additional data to isolate a select subset of callers. Such data may or may not have been available during all or a portion of the data-gathering period.

Sub-blocks of the computer 22, in addition to the test unit 23, also are illustrated in the block designating other components of the computer 22 actually to represent various internal component operating structures. In formulating the data records to be stored, the computer 22 employs logic operations which are performed by a sequencer and encoder 24. During statistical processing operations, the computer 22 utilizes a data test buffer 26 along with a statistical analysis program means 28. Exemplary operations and formats for these elements are treated below.

The computer 22 is connected to a voice generator 30, a manual terminal 31, a memory 32 and a look-up table 33. Note that these components are illustrated separately from the computer 28 for purposes of simplified explanation. The voice generator 30 functions to selectively provide voice messages through the interface unit 20 and the

communication facility C to currently active remote terminals. The manual operating terminal 31, located at the central station D, communicates with the computer 22. In the context of the present invention, the manual terminal 31 is activated at a time when it is desirable to abort automated data processing operation as described in detail below. Finally, in the illustrative embodiment, the computer 22 is coupled to the memory 32 containing a plurality of individual cells C1-CN which are employed to register the data from individual callers at the terminals. During data accumulation phases, the apparatus at the central station D acquires data in the memory 32 utilizing individual cells C1-CN for the individual callers. Subsequently, during the statistical processing operation, the computer 22 receives data through a command terminal 34 which is tested with regard to the acquired data in the cells C1-CN of memory 32 so as to select and identify a subset of the individual callers or define action with respect to callers. Thus, the system is effective for use in statistical polling or merchandising to selectively identify a particular subset of data associated with a subset of individual callers and define associated action. In that regard, often it is important to positively identify the isolated subset of callers and also to enable those callers to verify their identity in association with the data. The system of the present invention accommodates those needs.

An appreciation of the philosophical operation of a system in accordance with the present invention may now be enhanced by considering an exemplary operation of the illustrative embodiment of FIGURE 1 to isolate a subset of people who are susceptible to a particular disease or infirmity. The

exemplary operation might involve a geographical area, as a large city, in which a particular health problem is somewhat acute. For example, a major population center where coronary artery disease is a significant problem might be polled. Accordingly, persons most susceptible to such disease could be identified for corrective recommendations or measures.

As an alternative example related to health, the system may process the resultant data from test kits. Specifically, test kits might be sold to concerned persons who would use the kit to obtain certain specific health data. For example, a person might purchase a kit containing the apparatus and instructions to perform various non-invasive procedures to obtain data that could indicate a health condition, e.g. pregnancy. The kit containing the apparatus could also include a key number for qualifying the purchaser to access the computer 22. The qualification would be performed by the key test unit 23 (described in detail below) which might simply incorporate a look-up table to check off key numbers as they are used or "consumed". With qualification, a caller could be instructed in detail and statistical data could also be acquired.

Returning to the example of generally polling a population center, people of the metropolitan area could be informed of the availability of a service for statistical health analysis. Accordingly, persons interested in their individual statistical situation would be motivated to utilize the service. Specifically, individual callers would use the remote terminals T1-TN to contact the central station D through the communication facility C and thereby provide personal information which would enable a statistical analysis in relation to existing data so as

to isolate and inform those persons statistically most likely to be in need of corrective measures. In such applications, it may be important that the caller's identity be subject to reliable verification. Other applications also may present a critical need for positively verifiable identification to the extent that credit card numbers and/or personal identification numbers may be employed.

An exemplary operation of the system, with regard to a specific caller, will now be treated referring somewhat concurrently to FIGURES 1, 2 and 3. As indicated above, FIGURE 2 indicates a data storage format and now will be considered with regard to a format in which data is composed for a caller in one of the cells C1-CN of the memory 32.

Pursuing the above example in accordance with the assumptions, further assume the existence of a caller at the remote terminal T1 who wishes to pursue health-related information on the basis of statistical analysis. The caller lifts the hand piece 10 and in accordance with conventional techniques actuates the push buttons 14 to establish communication through the facility C with the central station D. Upon receiving the call signal, the interface unit 20 (central station D, FIGURE 1) actuates the computer 22 to ~~queue~~ cue the voice generator 30. The sequence of operations is represented to be initiated in FIGURE 3 by the "enter" block 40 which is accordingly followed by a "~~queue~~ cue voice generator" command block 42. Accordingly, the voice generator 30 (FIGURE 1) formulates speech, a representative form of which might be: "Thank you for participating in the coronary artery disease statistical analysis. Please give us your telephone number by actuating the call buttons on your telephone instrument."

Acting on the instructions, the caller would push the buttons 14 in sequence to indicate his telephone number, e.g. "6200711". This data could be taken directly from the system as it is available in certain telephone apparatus of the facility C. The time of day also could be taken. The resulting data signals are communicated to the interface unit 20 (FIGURE 1) then applied to the computer 22 for testing as a valid telephone number. Note that the number can be tested by the look-up table 33 (FIGURE 1) as separately illustrated. Essentially, the format of a proper number prompts the look-up table to produce a valid or "good" signal. The test is indicated by the block 44 (FIGURE 3). If the response is not valid, for example contains an inappropriate number of digits, the operation of block 46 is initiated again cuing ~~queueing~~ the voice generator 30 (FIGURE 1). Accordingly, the voice generator reinstructs the caller, e.g.: "You have not entered a proper telephone number. Please reenter your telephone number by pressing the appropriate call buttons."

The caller is then allotted a predetermined period of time to make a proper entry with the consequence that the system moves to a test operation as indicated by the block 48 (FIGURE 3). Specifically, block 48 poses the query: "Is the second try good?"

If the caller is again unsuccessful, the system purges the record as indicated by the block 50 and the call is terminated as indicated by the block 52. In an alternative mode, the computer 22 may abort the interface and couple the manual terminal 31 for communication with the caller. The interchange would then proceed, person-to-person.

If the caller responds with a proper telephone number, the operation proceeds.

Specifically, the system sequences to record the response of the proper telephone number as indicated by the block 54. That is, the caller's telephone is recorded in a specific cell C1-CN identified with the caller. The format of the cell C1 is indicated in FIGURE 2. The first portion, section 53, contains the caller's telephone number, i.e. "6200711". Note that as explained above, if the second attempt to formulate a proper number is successful, as manifest by the block 48 (FIGURE 3), the response is recorded at that stage. In either case, exiting from the block 54 (FIGURE 3) invokes the next operation of again ~~queuing~~ cuing the voice generator as indicated by the block 56.

As an alternative, if a selective-group polling operation is performed, as mentioned above, the caller is qualified by providing the "one-time" key number included in his package. As indicated above, the unit 23 may incorporate a look-up table for proper key numbers. Proper numbers may be coded using any of a wide variety of techniques. As a simple illustrative example, the key may comprise a precise number of digits that always total a particular numerical value.

The key test unit 23 performs the test as an initial qualification. Next, the unit 23 verifies that the key given by a caller has not been consumed by prior use. Thus, the unit 23 may simply incorporate some arithmetic test capability along with a look-up table as well known in the art.

Returning to the detailed example, the system proceeds after the caller is qualified. Specifically, the ~~queue~~ cue to the voice generator 30 (FIGURE 1) as represented by the block 56 produces a request for further information from the caller. For example, the voice generator might request information by stating: "Please use the telephone buttons to indicate the

initials of your first and last names using the asterisk button for the letters Q and Z."

The detailed operation is not represented in FIGURE 3 as it is similar to the operation illustrated by the blocks 42 through 54. However, again, a proper response is registered in the storage cell C1 as illustrated in FIGURE 2 by the number "53" also registered in the first section 53 of the cell.

The cycle of obtaining digital information from the caller next is repeated with respect to substantial specific health data. For example, as illustrated in FIGURE 2, the next section 58 in the cell C1 receives an accumulation of health data, including the caller's age, weight, ..., pulse rate, and so on. Representative digital numbers are illustrated in FIGURE 2.

During the course of the telephonic communication, the computer 22 formulates identification data for the caller specifically including: the chronological sequence of the call, the assigned designation of the call, and a set of acknowledgment digits for the call. Such data identification is registered in the assigned cell C1 in accordance with the format of FIGURE 2 being stored in sections 62, 64 and 66. Note that the data may be stored in a coded interrelationship. For example, the acknowledgment digits may be related to the call record sequence. In the illustrative example, the chronological order number of the caller is 4951. The acknowledge digits may be derived from the sequence number. For example, as illustrated, a coded relationship may be established by adding "two" to each of the individual record sequence digits. Considering the example numerically:

T0150X

4951
2222
Adding without carries: 6173

According to the example, the call chronological sequence registered for the caller is 4951 as represented in the section 62 while the acknowledge digits are 6173 as registered in the section 66. Additionally, the computer develops an assigned designation number, e.g. designation "4951684", which is registered in the section 64 and an acknowledge code or digits, e.g 6173, registered in the section 66. These values are formulated in accordance with conventional number techniques during the data acquisition phase. Specifically, with the exemplary numerals formulated, the operation proceeds.

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The computer 22 (FIGURE 1) cues ~~queues~~ the internal memory. That operation is indicated by the block 68 (FIGURE 3). Thus, the computer 22 fetches the call record sequence number, assigns a designation (if not previously assigned), and encodes the sequence number as the acknowledgment digits (if not previously accomplished). These operations are indicated by the block 70 (FIGURE 3). Next, the computer 22 (FIGURE 1)

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cues ~~queues~~ the voice generator as indicated by the block 72 (FIGURE 3) to provide information to the caller. Specifically, for example, the voice generator 30 (FIGURE 1) might state: "This transaction has been designated by the number 4951684, and is further identified by the acknowledgment digits 6173. Please make a record of these numbers as they will be repeated. Specifically, the designation number is 4951684. The acknowledgment digits are 6173. Please acknowledge this transaction by pressing your telephone buttons to indicate the acknowledge digits 6173." In various applications as those involving security, the

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order and acknowledgment of callers may be very important. Therefore, data for confirmation associated with the order is important.

The system next assumes a test mode as indicated by the block 76 (FIGURE 3). If the caller provides the correct acknowledgment digits, the data is confirmed in the record as indicated by the block 80 and registered in the cell C1 (FIGURE 2). Additionally, the voice generator 30 (FIGURE 1) is sequenced as indicated by the block 82 (FIGURE 3) to indicate the close of the communication and that the transaction is terminated as represented by the exit block 84.

In the event that the caller cannot confirm his acknowledgment digits, as indicated by the block 76, a repeat operation is performed as indicated respectively by the blocks 86 and 88. Specifically, the voice generator 30 (FIGURE 1) is cued for a second instructional message. In the event that the second attempt also fails, the data is purged and the call discounted as indicated by block 90. If the second try is successful (test block 88), as indicated by the block 80, the record is perfected as indicated above.

As a result of the likelihood of a large number of calls, as described above, the data cells C1-CN in the memory 32 (FIGURE 1) are developed with specific information indicative of a statistical sampling of the populace of concern. The data of that statistical sampling may be self-generating of specific conclusions with respect to a subset of individuals, and/or supplemental data may clearly manifest a significant subset. For example, the data may indicate a significant departure from an assumed normal characteristic. Such data, accumulated from the

polling, may be considered by logic comparisons in the computer 22 to select the subset of persons who should be isolated.

In addition to the self-generating conclusions available from the received data, the system may involve the introduction of external data. In the physical fitness example, such external data might take the form of national statistical data. In any event, the processing operation usually involves comparison testing which compares caller data from individual cells C1-CN with test data that is supplied to the statistical analysis program means 28 through the command terminal 34.

As a simplistic example, health data including age, weight, ... pulse, may be formulated into a composite number reflecting rated values for each of the data elements. Such a composite number may then be placed in the data test buffer 26 for sequential testing against similarly composed numbers formed from the data in the individual cells C1-CN. Based on such comparative testing, a subset of persons may be identified. Presumably those persons will be informed of their circumstances. Note that the command terminal 34 incorporates a display or other output data apparatus as standard in the art for manifesting the subset. However, it is important that identifications be confirmed as accurate. It is in that sense that the assigned designations as registered in the section 64 (FIGURE 2) and the call record sequence, as registered in the block 62, are important. Note that multiple comparative processing operations may be desirable or necessary to isolate and confirm a subset of significant concern.

In the above example, members of the public were simply invited to use the service. A number of

alternatives exist which might well impact on the statistical analysis. For example, callers might be restricted to the purchasers of a specific product as a medical apparatus for measuring blood pressures, heart rates, or so on. In such situations, it will be apparent that the statistical data will be somewhat distorted from an average or normal sampling. Clearly, the computer 22 can be programmed to take into account such considerations. In that regard, the computer 22 might also verify identification data proffered by a caller. Such data might take the form of a credit card number or a personal identification number. Various techniques for verification of such numbers using computer techniques are well known and recognized in the prior art.

As indicated above, the system can be formatted for use in a variety of applications, including the automation of a mail order operation. Preliminary to considering an exemplary form of such an application, a disclosed embodiment of the key test unit 23 will be considered as illustrated in FIGURE 4. A test unit voice responder 110 (FIGURE 4, upper left) is coupled to the interface unit 20 (FIGURE 1). The voice responder 110 may be integrated with the voice generator 30 (FIGURE 1), or take the form of a separate unit. In any event, the responder functions as a channel or conduit for signals passing in and out of the unit and on command forms modulated voice signals to enunciate words in accordance with signals from a vocal word memory 112.

As a signal channel, the responder supplies received signals to an assembly register 114 and to an abort signal detector 116. The abort signal detector 116 may simply take the form of a decoder that is actuated to produce an abort signal on receiving a

digital signal to manifest a specific binary code, e.g. the code word representative of the asterisk button (*) on the panel 12 (FIGURE 1). From the detector 116 (FIGURE 4) the abort signal is applied to an "and" gate 118.

As indicated above, signals received by the responder are applied to the assembly register 114. Signal data received by the register 114 is compiled. The data includes the preliminary information for a caller. That information is supplemented with additional data to complete a memory cell word as illustrated in FIGURE 5.

The register 114 is connected to supply its contents to the "and" gate 118 as well as a similar "and" gate 120. Functionally, the gates 118 and 120 pass the contents of the assembly register 114 at the time when a qualifying signal is received. The gate 118 is qualified by the abort signal from the detector 116 and the gate 120 is qualified by a signal from a look-up table 122.

Essentially, the look-up table 122 is indexed and addressed by the identification numbers of callers and responds with approval signals for the callers, if appropriate. The look-up table is also connected to supply disapproval signals to the vocal word memory 112. Note that the memory 122 also is coupled to receive addressing signals from the register 114.

Consider now the operation of the system of FIGURE 1, with the key test unit 23 as illustrated in FIGURE 4 and with a system format to automate a mail order operation and assemble data in cells of the memory 32 as illustrated in FIGURE 5. Accordingly, assume that a caller establishes communication with the system as explained above.

As an initial preliminary action, the voice responder 110 might be cued to identify the mail order house and indicate that the order will be taken by computer. The caller also might be advised that if he prefers to communicate directly with a person, or needs such contact at any point in the communication, he may accomplish it simply by pushing the asterisk button (*) on his telephone. Alternatively, the customer may be asked by the voice generator 30 to provide (by voice) longer information as name, address, etc. which is recorded for later processing. Such action forms an abort signal that is detected by the detector 116 to qualify the gate 118. As a result, the contents of the register is passed to the manual terminal 31 (FIGURE 1) with the command to take over the communication. If preliminary data has been assembled in the register 114, such data will be displayed by a CRT of the terminal 31 to facilitate further communication.

After the preliminary information is supplied to a caller, the data collection phase is initiated. For example, the voice responder 110 might announce: "Please indicate the type of credit card you will use for your purchase by pushing the button number one for Mastercharge, two for ...."

The caller's response, indicating a specific credit card, is stored in the register 114, specifically in the first data block 130 as illustrated in FIGURE 5. The responder next instructs the caller to use the telephone buttons to indicate his credit card number and the expiration date of the card. That data is stored in the register 114, specifically in the blocks 132 and 134 as illustrated in FIGURE 5. Similarly, in the disclosed embodiment, the caller is asked for his customer number, as it may appear on his

catalog. That number is stored in a block 136 of the register 114. Note that the caller may not be in the files of the mail order house and in that event, the operation may be shifted to a manual operation to be continued through the manual terminal 31 as explained above. For a television initiated mail order transaction, other numerical codes might be employed as to key into broadcast schedules. For example, a code might be used to indicate program times and thereby enable evaluation of the productivity of such program times.

To continue with the explanation of the automated format, assume that the customer has a number and that it is stored in the assembly register 114 along with his credit card number and expiration date. From that location, the data is checked for propriety as part of the initial test operation. The check or test is in two stages. First, the data is verified to be accurately registered by confirming it with the caller. Second, the data is verified as representing valid and proper data formats for the customer's number, the credit card number and expiration date. The test may also include a step of consulting a so-called negative list to assure that the identified card and customer's number have not been cancelled, as for example in the case of credit cards that have been lost or stolen.

To accomplish the first stage of verification, under control of the computer, the vocal word memory 122 is prompted to actuate the responder 110 to announce the registered data including the card number. Specifically for example, the memory 112 is addressed by the digits of the card number as stored in the register 114. Accordingly, the memory 112 supplies modulated voice signals to the responder 110. The

mechanically stated message might be in a fixed format except for the card number, for example: "Please verify your card number as it will now be repeated. If the number is 2745273845957, please push the one button."

If incorrect numbers are stored in the register 114, a corrective cycle may be sequenced as explained with respect to the first operating format. Also as explained above, with repeat failures, the communication may be terminated or the system may shift to a manual format by activating the terminal 31 (FIGURE 1) attended by an operator.

If the customer's number, card number and the expiration date are verified by the caller as correctly recorded in the register 114 (FIGURE 4), the operating sequence proceeds. Accordingly, the system proceeds with the next phase of the test and checks the current propriety of the data in the register 114. Under control of the sequencer 34 (FIGURE 1) the card type, number and expiration date, along with the customer's number as contained in the register 114 (FIGURE 4) are supplied to the look-up table 122 for approval. A variety of different checks may be implemented in the table, depending on the nature of the system. In a minimal system, the table 122 verifies the propriety of the data simply as to form. In a more complex embodiment, the structure of the table 122 may include a negative list of unacceptable cards and customer's numbers. For still greater control, the structure of the table 122 might incorporate a memory for scoring transactions of individual card holders as with reference to time. Various structures and formats for such operations are well known in the credit verification and approval art.

In the disclosed embodiment, the look-up table 122 carries the full names and addresses of the customers. Accordingly, in response to the customer's number, the look-up table operates through the vocal word memory to activate the voice responder. Specifically for example, the responder might be activated to state: "Please confirm that your full name is John J. Jones by pressing the one button." Similarly, the address and any other pertinent mailing information is confirmed. With confirmation, the data is stored in the register 114. Specifically, a block 138 (FIGURE 5) of the register 114 (FIGURE 1) receives the name and address data. Of course as explained above, difficulties might prompt either manual interface or termination of the communication.

With the successful completion and verification of all the preliminary data in the register 114, the look-up table qualifies the "and" gate 120 transferring the contents of the register 114 (FIGURE 4) to a data cell in the memory 32 (FIGURE 1). Essentially, with the caller testing complete, the preliminary phase of operation is concluded and the system next interfaces with the caller to acquire and process data for a specific order of merchandise. That operation is performed by the structural components as illustrated in FIGURE 1 to load a cell in the memory 32.

Somewhat as described above in relation to the initial operating embodiment, the voice generator 30 prompts the caller through a series of exchanges that load the memory cell with a merchandise order. For example, the interchange might be as follows. The voice generator might instruct: "Please use the telephone number buttons to enter the item number of your purchase."

The caller might then enter the number "1124" which would be set in the data test buffer 26 and supplied to address the look-up table 33. In response, the look-up table 33 would cue ~~queue~~ the voice generator 30 to announce: "That is item number 1124, a small white men's polo slipover cotton shirt at $11.95. If that is correct, please push the button one on your telephone. If it is not correct, push the button two and re-enter the item number."

The caller could confirm or reject the item. As items are confirmed, they are loaded from the buffer 26 to the designated cell in the memory 32. With the registration of an item in the memory 32, the caller is asked to indicate whether or not he wishes to order additional items. Accordingly, the cycle may be repeated. Of course, as explained above, at any stage the customer can abort the mechanical interface and establish personal communication with an operator at the terminal 31. Also, some operating formats might automatically make the shift, as where the callers are all strange to the system and complex data must be registered as names and addresses.

As purchase items are confirmed, representative data is loaded into the assigned cell of the memory 32 as illustrated in FIGURE 5. Specifically, a series of storage blocks are loaded as exemplified by the blocks 140 and 142. The interchange continues until the customer indicates he does not wish to order any additional items. The system then operates the voice generator 30 to announce the acknowledgement digits as stored in the block 144 (FIGURE 5) of the assigned data cell in the memory 32 (FIGURE 1). The acknowledgement digits serve to identify the order both for the caller and the mail order house. Accordingly, tracing is facilitated.

The individual cells of the memory 32 are processed to originate filling orders. In that regard, the statistical analysis program means 28 accumulates totals of specific items which are then utilized for inventory control. Specifically, comparisons can be performed between order totals, objective and existing inventories to generate lists for inventory adjustment. Thus, the system effectively analyzes acquired data to accomplish the desired objectives. To consider such analysis in somewhat greater detail, reference will now be made to the block diagram of FIGURE 6.

FIGURE 6 functionally illustrates a component of the analysis means 28 (FIGURE 1) specifically for processing data to develop a related set. Generating a data set or subset with respect to any particular polling or data accumulation operation can be very significant. For example, in a polling operation it may be desirable to isolate specific sets or subsets of persons or subjects falling into a specific category as explained above. With respect to merchandising operations, it may be desirable to isolate sets of files either for inventory control purposes, order processing or in the interests of avoiding fraud. Some examples will illustrate the functions.

In a mail order operation, shipments often can be expedited by providing lists of similar items that are to be shipped. Accordingly, it is desirable to isolate a subset of orders on the basis of the items ordered, for example as specified in block 140 of the storage cell of FIGURE 5. The same information is useful for inventory control. For example, after isolating a subset of orders or a specific article, the number of articles may be tallied to indicate inventory depletion.

As indicated above, isolating subsets of order data also may be helpful in avoiding fraud. Consider a likely gang operation. With an intention to defraud, a number of illicit credit cards may be acquired. Specifically, for example, the cards may have recently been stolen with the consequence that they likely can be used for a short period of time. A potentially profitable use of the cards would be to support the purchase of a large volume of merchandise from a mail order establishment. Normally such an operation would involve readily marketable merchandise.

In the fraudulent use of the illicit cards, data falls into three categories. First, the card itself specifies certain data. Second, certain data involves the order; and third, data is provided to indicate the shipping destination for the merchandise. In a gang operation, a common shipping destination may be employed for a short period. Consequently, a major subset of merchandise order data designating a similar destination for merchandise should prompt suspicion. If the subset further indicates relatively marketable merchandise, further suspicion is aroused. Of course, at some point an investigation is desirable prior to delivering the merchandise. Accordingly, it is important to assemble a data subset wherein the block 138 (FIGURE 5) specifies similar data.

Similarly, a sizable subset indicating multiple orders on the same credit card (block 132) may also suggest the need for investigation. Reference will now be made to FIGURE 6 indicating a symbolic arrangement for acquiring or defining subsets of data during the course of the processing operation.

As illustrated in FIGURE 6, the memory 32 is illustrated in FIGURE 6 with the multiplicity of cells. The cells may be sensed by a scanner 150 illustrated

for purposes of explanation as a mechanical apparatus. Of course, the system of the analysis means 28 (FIGURE 1) would incorporate solid state operation to accomplish the function of the scanner 150. In any event, the scanner 150 sequentially receives the contents of cells C1 through CN for providing representative signals to a comparator 152 and an "and" gate 154. The comparator 152 also receives signals from a reference register 156 which is in turn connected to receive signals from within the computer 22, e.g. from the buffer 26. The comparator 152 also receives a command signal in the form of a specified data block to indicate the portion of cell data units to be compared.

The output of the comparator 152, a binary signal in a high state in the event of a comparison, qualifies the gate 154 to pass the contents of a cell to a set register 158. Consider an exemplary operation.

Assume, for example, that it is desired to test the data in each of the cells C1 through CN with respect to specific health data. The reference health data would be set in the reference register 156 from any of the sources within the computer 22. The comparator 152 would receive a test instruction for the digits in the data block 52 (FIGURE 2) reflecting the health data. The system would then be commanded to proceed, and data from individual cells C1 through CN would be supplied through the scanner 150 to the comparator 152. Upon the occurrence of a coincidence, the comparator 152 would qualify the "and" gate 154 to pass the data cell contents to the set register 158. At the termination of the operation, the subset of data from the cells C1 through CN having the specified similarity would be contained in the set register 158.

Accordingly, such data could be further processed as suggested above within the analysis means 128.

To consider another exemplary operation, assume the system of the present invention is embodied for a mail order facility and concern exists with respect to a volume of orders supported by illicit credit cards and destined for a "drop" address. In such an instance, the contents of the data block 138 (name and address data) as illustrated in FIGURE 5 would be of concern. Accordingly, the comparator 152 would be set to test the contents of data block 138. Next, the contents of cells C1 through CN would be sequentially applied to the reference register 158 and the comparator 152. Upon detecting a coincidence between a pair of cells with respect to the data block 138, one of the cells would be held in the reference register 156 to scan through the remainder of the cells C1 through CN and thereby accumulate a subset of data in the register 158 indicating a similar destination address for merchandise. With review, determinations could then be made either within the analysis means 28 or by a manual observation as to whether or not investigation appeared appropriate.

A wide variety of other possibilities, applications and formats in accordance herewith will be apparent to those skilled in the art wherein data is assembled, stored, identified, processed by testing as to isolate a subset or manifest data with sources reliably confirmed. With respect to identification data, it may be an identification such as a credit or identification card number, driver's license number, telephone number, etc. Alternatively, identification data may be a combination of identification-related data such as, for example, credit card number, merchant identification, expiration date of credit card and

amount of transaction. For example, merchandising, polling, selecting and related operations are practical.

In view of the above explanation of the exemplary system, it will be appreciated that embodiments of the present invention may be employed in many applications to accumulate statistical data, process such data, and define subsets of callers of concern. While certain exemplary operations have been stated herein, and certain detailed structures have been disclosed, the appropriate scope hereof is deemed to be in accordance with the claims as set forth below.